Evaluating Progress

A Report on the Findings of the Massachusetts Toxics Use Reduction Program Evaluation

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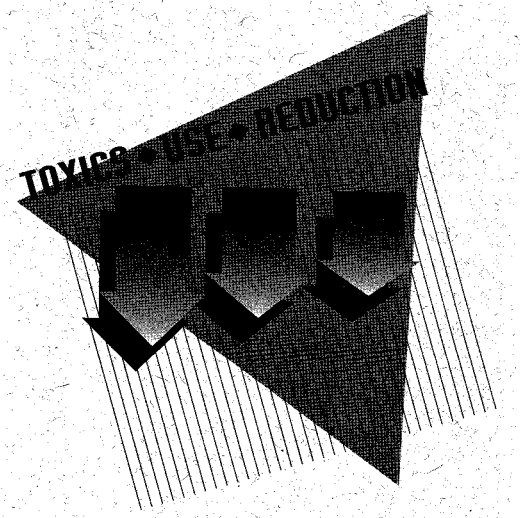


Executive Summary

prepared by
The Massachusetts Toxics Use Reduction Program

EXECUTIVE OFFICE of ENVIRONMENTAL AFFAIRS

Office of Technical Assistance

TOXICS USE REDUCTION INSTITUTE

Toxic Use Reduction Institute

DEP

Department of Environmental Protection

Executive Summary

In 1989 the legislature of the Commonwealth of Massachusetts unanimously passed the Toxics Use Reduction Act (TURA) which created the Massachusetts Toxics Use Reduction Program. A central goal of TURA (M.G.L. Chapter 211) is to cut in half by 1997 the quantity of toxic and hazardous wastes generated by Massachusetts industries – using toxics use reduction (TUR) techniques – while enhancing the capacity of Massachusetts businesses to grow and prosper. The Toxics Use Reduction Act was the product of a long negotiation process between business and environmental interests, resulting in a bill endorsed by both. Approximately 600 Massachusetts firms participate in the TURA program.

Toxics Use Reduction is defined in the Act as:

> "...in-plant changes in production processes or raw materials that reduce, avoid, or eliminate the use of toxic or hazardous substances or generation of hazardous byproducts per unit of product, so as to reduce risk to the health of worker, consumers or the environment, without shifting risks between workers, consumers, or parts of the environment."

In the summer of 1995, the agencies charged with administering the Toxics Use Reduction Act began an evaluation of the Toxics Use Reduction program. The agencies formed a planning group to coordinate the planning and implementation of the evaluation. The Toxics Use Reduction Institute spearheaded this effort. In designing the evaluation the planning group obtained advice and assistance from a consultation group made up of representatives of various interested stakeholders.

This report presents the findings of the TURA program evaluation. It draws together the results of several efforts:

- **Three significant studies conducted by independent contractors**
  - A survey of the 1993 TURA filers with 434 of 645 (or 67%) firms responding
  - An in-depth investigation of TUR at 25 Massachusetts manufacturers
  - A social benefit-cost analysis of the TURA program
- **An inventory and assessment of the programs undertaken by the TUR agencies**
- **Analysis of the TURA data**

Four major questions are posed and addressed in this evaluation:

1. Did the firms and agencies implement the law?
2. What happened to toxic chemical use, byproducts and emissions?
3. How valuable are the program elements and resources?
4. What are the costs and benefits of the TURA program?

Did the TURA Firms and Agencies Implement the Law?

The evaluation found that Massachusetts TURA firms are making significant efforts to implement the law by changing their practices and processes to reduce their dependance on toxic chemicals. The survey of TURA filers indicates that TURA firms have significantly increased their involvement in key TUR practices since implementation of TURA in 1990 to the present. Only 30% of TURA firms were reviewing changes in production processes for their environmental, health and safety impact in 1990 while 76% report doing so today. Eighty one percent of survey respondents stated that they have or will implement *at least* a few of the projects selected for implementation in their TUR plan and all 22 TURA firms studied in the in-depth investigation were found to have implemented TUR projects between 1990 and 1996. Barriers to TUR implementation do exist; in the survey, a large number of respondents stated that company concern with impact on product quality and customers not accepting change in products are the chief barriers to TUR.

Facility Involvement in Toxics Use Reduction Activities, Before 1990 and Now*

Activity	*Percentage of respondents "very involved" in [activity]***	
	Before 1990	*Now*
1. Tracking quantities of wastes generated	49%	89%
2. Tracking quantities of chemicals used	48%	90%
3. Establishing a corporate or facility environmental team	24%	68%
4. Setting goals for waste reduction	24%	73%
5. Reviewing changes in production processes for their environmental, health and safety impact	30%	76%
6. Allocating environmental costs to processes or products	21%	52%

*Total number of facilities = 434, Survey administered in June-July, 1996.
**Note: only "very involved" responses shown. Other responses were: somewhat involved and not at all involved.

Furthermore, the survey data show a clear connection between TUR implementation and reductions in byproduct generation and toxic chemical use. Survey respondents were asked if their facility's net byproduct generation and toxic chemical use (per unit of total production) had increased, decreased or remained unchanged since 1990. The survey researchers found the following:

Of the facilities that said they have or will implement at least a few of the projects *identified in their TUR plans*:

- 61% reported that they have *decreased* their byproduct generation since 1990,

  and
- 67% reported that they *reduced* their toxic chemical use during the same time frame.

Whereas, of the firms that have not implemented any of their identified TUR projects:

- 61% reported that by-product generation has *increased or remained unchanged* since 1990,

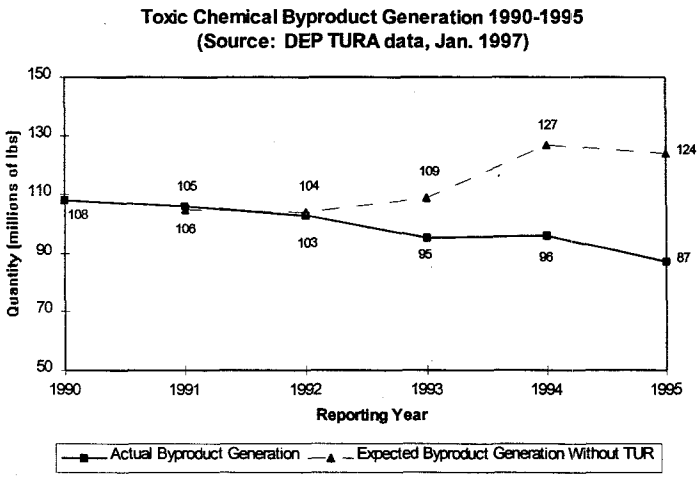
  and
- 66% reported that toxics use has *increased or remained unchanged*, during the same time frame.

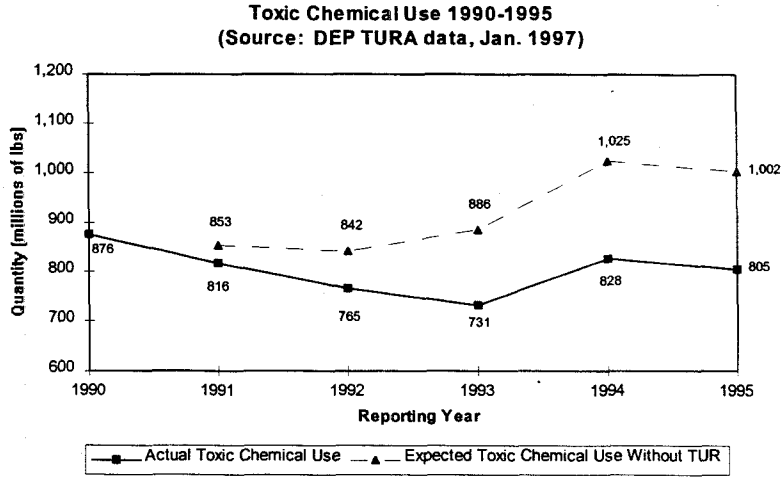
Therefore, it appears that TUR implementation has resulted in reductions in byproduct and use in a significant number of companies, and lack of implementation shows the opposite effect.

Since the inception of the TURA program, the TURA agencies have put in place numerous and varied programs and activities supporting toxics use reduction, involving members of Massachusetts industry and the general public. The Toxics Use Reduction Act contained 55 mandates and 14 discretionary tasks to be accomplished by the TURA program agencies. An accounting of these mandates shows that the agencies have fulfilled a total of 45 (or 82%) of these mandates. Ten of the 55 mandates (or 18%) have not yet been fulfilled. These statistics show that the program agencies have fulfilled most of the numerous and complex mandates of the law.

What happened to Toxic Chemical Use and Byproducts?

Massachusetts industries are making progress in toxics use reduction. Between 1990 and 1995, the six years for which TURA data exists, byproduct generation declined by 30% and toxic chemical use dropped by 20%. These figures have been normalized to take into account changes in levels of production. According to the survey, 55% of facilities decreased their byproduct generation and 60% decreased their use of toxic chemicals per unit of total production, since 1990. The following two graphs demonstrate these data trends.





How Valuable are the TURA Program Elements and Resources?

The firms were asked about the value of TUR implementation, planning, reporting and the resources available to them under the TURA program. The most frequently reported benefits of TUR implementation were cost savings (67% of respondents) and worker health and safety (66%). Seventy percent, or 302 out of 434 survey respondents indicated that they had identified TUR opportunities *as the result of* their 1994 plan. Of the 21 firms in the in-depth investigation that had conducted TUR planning, 11 stated that planning was a major factor in driving them to consider and implement TUR. Four firms stated that planning was important but not a major factor and six firms failed to implement TUR through planning. Of the six that had not implemented TUR, three indicated that they did not believe *a priori* that planning would be productive and devoted few resources to it. Of 22 TURA firms interviewed, six stated that the annual reporting requirements provided benefits for their operations including: better information about materials in products, processes and waste streams, as well as providing a priority list of chemicals for TUR efforts. Twelve of 22 respondents reported that the collection of data for Form S reporting provided no benefit to their operations.

In the survey TURA agency services were found to be "very" or "somewhat" useful in implementing toxics use reduction by almost all of the respondents that have had exposure to them. Toxics use reduction planner training and site visits from the Office of Technical Assistance (OTA) were regarded as the most useful TURA resources.

What are the Benefits and Costs of the TURA Program?

The study of the benefits and costs of TURA concluded that the benefits of TURA to the Commonwealth exceed the costs of TURA for the period 1990 to 1997. This conclusion was reached purely on the basis of monetized costs and benefits as reported by TURA firms and is exclusive of the non-monetized human health and ecological benefits of the Act. The study identified $77 million as the total costs of implementing the TURA program and total *monetized* benefits of $91 million. The monetized benefits should be considered only a partial picture of the benefits of the TURA program because the value associated with the human health and ecological benefits of the Act, benefits to non-TURA firms, and several other benefits were not monetized. The following figure presents the results of the benefit-cost study.

Monetized and Non-monetized Costs and Benefits of TURA

(1990 through 1997 - millions of 1995 dollars)

Costs			**Benefits**	
Monetized				
Compliance Costs:			Savings in operating costs (=net operating cost changes)	$ 88.2
-Form S preparation	$ 9.9			
-TUR plan preparation	$ 10.1			
-Form S filing fees	$ 29.1		Federal grants to TURA program for TUR activities in Massachusetts	$ 2.3
-Other TURA fees (TUR planner training, continuing education, certification)	$ 0.3			
Subtotal		$ 49.4		
Capital investments	$ 27.1	$ 27.1		
Total monetized TURA costs		$ 76.6	**Total monetized TURA benefits**	$ 90.5
Non-Monetized				
			Human health and ecological benefits from: -reduced worker health and safety risks from exposure to toxic chemicals -reduced public health and safety risks from exposure to toxic chemicals -reduced environmental exposure to toxic chemicals Increased revenue from TUR improvements in processes and products Activities of TURA program agencies in other regulatory and non-regulatory programs Benefits to non-TURA firms in Massachusetts from TURA program resources Value of TURA data to public data users in the Commonwealth	

Is the TURA Program Meeting the Six Policy Goals of the Act?

The TURA program has made great progress toward meeting the six goals stated in the Toxics Use Reduction Act.

The first goal involves reducing the generation of toxic wastes by 50% from 1987 to 1997. It is not yet possible to determine whether the goal will be reached since TURA waste data are only available for the period 1990 to 1995 and the results of efforts to estimate the 1987 baseline are inconclusive. What can be said, however, is that the TURA data indicate a very significant reduction of 30% in byproduct resulting from TUR during the period 1990-1995. This period represents five years of reporting by TURA firms, where byproduct reductions averaged 6% per year.

The second goal establishes TUR as the preferred means of compliance with environmental laws. Through the Department of Environmental Protection's (DEP) multimedia inspection program, Massachusetts is making strides toward establishing toxics use reduction as the preferred means of achieving compliance with the environmental laws – federal and state – under its purview. This evaluation found that when TUR *was* addressed in an inspection, results were impressive; two out of three firms receiving TUR recommendations implemented them. However, the evaluation also found several notable shortcomings of the program. TURA agencies have been working with other state agencies to help promote TUR in non-environmental regulatory programs such as those focused on worker health and safety and on radioactive wastes.

The third goal promotes the competitive advantage of Massachusetts businesses. This evaluation provides evidence that firms are indeed lowering their production costs through TUR. Sixty seven percent of survey respondents that had reported implementing TUR said that they actually saw direct cost savings (e.g., on materials use or waste disposal) and 66% reported that they realized improvements in worker health and safety. Thirty eight percent of survey respondents stated that TUR has improved their firms environmental image and 27% claim TUR created a marketing advantage While only a minority of respondents reported reduced regulatory compliance requirements (45%) this number is not insignificant considering the financial benefits of reduced regulatory cost. However, a notable majority of survey respondents answered that company concern with impact on product quality was an important factor in their company's decisions <u>not</u> to implement TUR projects.

The fourth goal seeks to reduce the production and use of toxic hazardous substances. Good progress is being made toward this goal. From 1990 to 1995 toxic chemical use, (i.e., the sum total of chemicals manufactured, processed or otherwise used) dropped by 20% as a result of toxics use reduction. The survey found that 60% of facilities decreased their use of toxic chemicals per unit of total production since 1990. This evaluation establishes a strong connection between these reductions and the programs and resources of the TURA program by documenting the significant impact that planning under TURA and other program resources have had on motivating or assisting firms to implement TUR. The evaluation cannot, however, draw conclusions about the impact of other state regulatory programs on progress in toxic chemical production and use reductions.

The fifth goal seeks to enhance and strengthen the enforcement of existing environmental laws. By incorporating a multi-media focus into its regulatory enforcement programs, DEP has made significant strides toward increasing the effectiveness of enforcement efforts. The multi-media inspections simultaneously check for compliance with applicable environmental rules for air, industrial wastewater, hazardous waste, and TURA. In addition, the TURA agencies, and OTA in particular, have lent their expertise to a number of important programs aimed at strengthening a variety of state and federal environmental regulatory programs.

The sixth goal promotes coordination between state toxics-related programs. The evaluation found that the TURA agencies have undertaken many joint efforts with other state entities involved in toxics-related programs. These include the Attorney General's Office, the Division of Energy Resources, the Industrial Finance Agency, the Department of Public Health, the Department of Procurement and General Services, the Office of Business Development, the University of Massachusetts and the Massachusetts Water Resources Authority.

Implications from the Evaluation for TURA Program Improvements

The survey asked respondents in an open-ended question to identify changes that they would recommend for the TURA program. Respondents offered a wide range of suggestions for improving TURA: Twelve percent recommended eliminating the program while 14% recommended leaving it unchanged. The largest number of responses (19%) involved reducing the paperwork burden and simplifying the procedures. Another 16% of responses recommended changes to the toxic chemical list.

While suggestions from survey respondents provide valuable input for improving the TURA program, other results from throughout the evaluation provide implications for program improvements as well. These include:

- **Outstanding mandates.** Not all of the TURA mandates have been fulfilled. Unfulfilled mandates include: the consolidation of all reporting on chemical use, release and disposal; and development of an electronic system for filing TURA data.

- **Barriers to TUR.** The evaluation sought to elucidate barriers to TUR implementation. Based on the survey results, the most significant barriers appear to be company concern with impact on product quality, and customers not accepting change in the product. These barriers should be examined further, particularly to determine whether major technological gaps exist that impede firms from pursuing TUR.

- **Rewarding Leaders; Encouraging the Others.** Clearly many firms are making good progress toward toxics use reduction and others are finding the task more difficult. Consideration should be given to rewarding leaders and focusing resources on those firms that have not achieved great success with TUR.

- **Small Quantity Toxics Users.** The evaluation shows good progress in toxics use reduction among those firms subject to the requirements of TURA. It is not clear that the smaller quantity toxics users in the Commonwealth are making the same progress.

- **Other Areas of Human and Environmental Impact.** TURA is focused on reducing the adverse impacts of toxic chemical use by the industries covered by the Act. It appears that there may be great benefits if firms applied the principles of TUR planning to other important areas with environmental and health consequences, e.g., water use, energy use, the impact of the product when used, recycled, and discarded by consumers.